REMARKS

This amendment is submitted in response to the office action dated March 17, 2006. Applicants amend claim 17 so that it depends from claim 1 and no longer from claim 16 which was previously cancelled. Applicants also amend claim 36, so that it further clarifies the claimed invention, as requested by Examiner. These amendments do not raise new matter and thus raise no new issues. Claims 1-8, 10-14, 17 and 35-41 are pending in the present application; claim 15 is now cancelled.

§112 Rejections

Claims 39-41 are rejected under 35 USC 112, first paragraph, and claims 35-41 are rejected under 35 USC 112, second paragraph.

With respect to the rejection based on §112, first paragraph, Applicants argue that claims 39-41 do meet the written description requirement. First, Applicants use the disjunctive "or" in claim 35, which means that the third boundary line is either created between the N+ doped region and the P-well **OR** created between the N+ doped region and the N-doped layer. There is no requirement that the third boundary line is between the N+ doped region and both the P-well and the N-doped layer.

Second, Claims 39-41 are species to the generic claim 35, and are supported by the application as originally filed. Figures 2 and 4, which were originally filed with the application, both disclose the embodiments of claims 39-41. Specifically, Figure 2 shows that the N+ doped region is disposed within the N- doped layer, and thus separated from the P- doped well by the N- doped layer. Figure 2 provides support for claim 39. Despite this support, Applicants have requested amendment to part of the specification to explicitly describe the features shown in Figure 2. Figure 4 shows that the N+ doped region is disposed in the P- doped well and abuts the P+ region. This embodiment is also described on page 6, lines 1-5 of the application, which provides support for both claims 40 and 41.

Further still, originally filed claims 15 and 16 both provide support for claims 39-41 as they disclose the subject matter of claims 39-41. As such, it is clear that claims 39-

41 are supported by the application as originally filed, and as currently amended. Therefore, Applicants argue that the rejection under §112, first paragraph is in error.

With respect to the rejection based on §112, second paragraph, Applicants have amended claim 36 to clarify that the maximum depth of the second boundary is less than the first or third boundaries. This amendment does not contain any new matter, and therefore does not present any new issues. Therefore, claim 36 now particularly points out and distinctly claims the subject matter that Applicants regard as the invention, thereby overcoming the rejection under §112, second paragraph.

§103(a) Rejections

Examiner rejects claims 1-8, 10-15, and 17 under 35 U.S.C. §103(a) based upon Choy '705 in combination with Schlangenotto '428 and '858, all of record, though arguments for rejection of claim 35 are also presented.

Examiner states that Choy teaches in Figure 4 most of the elements of claims 1, with Schlangenotto '428 and '858 showing the missing elements. Claim 1, in part, recites a N+ doped layer extending into the substrate with an N- doped layer over the N+ doped layer, a P- doped well extending into the N- doped layer, a P+ doped region disposed in the P- doped well, and a N+ doped region laterally spaced from the P- doped well. Figure 4 of Choy does not teach the structure of claim 1 because the N+ source region 9 in Figure 4 is within the P- well. Claim 1 requires that the N+ doped region is laterally spaced from the P- doped well. Accordingly, Choy does not teach or suggest a N+ doped region that is laterally spaced from the P- doped well, as Figure 4 shows all the N+ source regions 9 disposed within P-wells.

Further, Schlangenotto '428 and '858 are relied upon to show that combined thickness of the P- doped well and the P+ doped region is about 5 to 12 μm, and to show the use of recombination centers in power diodes. The Schlangenotto references, however, do not make up for the missing elements that Examiner states Choy teaches. Moreover, with respect to the recombination centers, claim 1 recites that the recombination centers are disposed substantially in the N- doped layer and P- doped well.

The Schlangenotto references do not teach or suggest forming recombination centers substantially within the N- doped layer and the P- doped well. Rather, the references show formation of recombination centers throughout a power diode; the recombination centers are not limited to certain areas of the diode. Applicants show that forming the recombination center in the P- well and N- layer help to increase UIS performance. Therefore, Schlangenotto '428 and '858 do not show or suggest the elements of claim 1, as Examiner states. Applicants argue the rejection under §103(a) is in error based on the aforementioned regions.

Since claims 2-8, 10-15, and 17 all depend from claim 1, they incorporate each and every element and limitation of claim 1. Since the references do not either independently or in combination teach or suggest all the elements of claim 1, the references cannot render these dependent claims obvious.

With respect to claim 35, the arguments presented in regards to claim 1 above are herein incorporated. Further, the references do not show the limitation of claim 35, which is that the P+ doped region is vertically thinner than the P- doped well and the N+ doped region. Looking at the Figure 4 of Choy, the P++ doped regions 10 are not vertically thinner than the N+ doped region 9; the P++ doped regions are vertically thicker than the N+ doped regions. The references do not show or suggest the further limitation of claim 35 that the P+ doped region is vertically thinner than the P- doped well and the N+ doped region.

The references of record do not show or suggest the claimed P+ P- N- N+ structure with recombination centers substantially in the P- and N- regions of both claims 1 and 35. The references also do not show or suggest evidence of increase in UIS performance of the claimed device. Applicants request that Examiner review the comparative evidence provided in the application in evaluating patentability, as such evidence more than tips the scales in favor of patentability. Therefore, the rejection under §103(a) for claims 1-8, 10-15, 17, and claim 35 is improper for the aforementioned reasons.

Examiner rejects claims 35-41 under 35 U.S.C. §103(a) based upon a new reference Temple (US Patent No. 4,809,047) in combination with Schlangenotto '428 and '858 of record.

Examiner, relying on Temple, states that Figure 8 shows the elements of claim 35. Again, Temple '047, as with Choy, does not teach a device having a P+ doped region that is vertically thinner than the P- doped well and the N+ doped region; Figure 8 shows the P+ region as vertically thicker than the N+ region. There is nothing in the disclosure of reference stating that vertical thickness is less than that of both the P-well and N+ doped region. The reference does not teach or suggest this limitation.

Further, the Schlangenotto references are used to show use of recombination centers in power diodes, however, again, neither reference teaches or suggests the formation of the recombination centers substantially in the N- doped layer and the P-doped well. The location of the recombination centers is important because of the increase in UIS performance which results from the claimed device. The claimed structure in claim 35 is not shown or suggested in any of the references. Accordingly, dependent claims 36-41 cannot properly be rejected under §103(a), since the claim from which they depend is not shown or suggested by the references.

In sum, the rejections of all the claims based on §103(a) is erroneous. The art of record has been considered and does not render obvious the invention as now claimed whether viewed singly or in combination. The primary references (Choy and Temple) do not show or suggest the claimed inventions and the secondary references (Schlangenotto '428 and '858) do not make up for the deficiencies of the primary references. Applicants have demonstrated differences between the invention and the art applied to the claims and have provided persuasive evidence of dramatic and unpredicted results. Reconsideration of the application, including consideration of the evidence of unpredicted results found in Table 1 are requested. In view of the above showing, the invention is patentable over the art of record and a notice of allowance is requested.

Applicants appreciate the opportunity to call the Examiner but believe that this amendment to the claims and the forgoing remarks fully address the issues raised by the

Examiner. On the other hand, the Examiner is invited to call the undersigned attorney if he has any matters to address that will facilitate allowance of the application.

Applicants respectfully request favorable consideration and that a timely Notice of Allowance be issued in this case.

In the event that Applicant has overlooked the need for an extension of time, additional extension of time, payment of fee, or additional payment of fee, Applicants hereby conditionally petition therefore and authorize that any changes be made to Deposit Account No.: 50-3010.

Respectfully submitted,

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